

**U.S. FISH AND WILDLIFE SERVICE
SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM**

SCIENTIFIC NAME: *Chromolaena frustrata* (B.L. Rob.) R.M. King and H. Rob. (= *Eupatorium frustratum* B.L. Rob.)

COMMON NAME: Cape Sable thoroughwort

LEAD REGION: 4

INFORMATION CURRENT AS OF: October 2005

STATUS/ACTION:

☐ Species assessment - determined species did not meet the definition of endangered or threatened under the Act and, therefore, was not elevated to Candidate status

☐ New candidate

☒ Continuing candidate

☐ Non-petitioned

☒ Petitioned - Date petition received: May 11, 2004

☐ 90-day positive - FR date:

☐ 12-month warranted but precluded - FR date:

☐ Did the petition request a reclassification of a listed species?

FOR PETITIONED CANDIDATE SPECIES:

a. Is listing warranted (if yes, see summary of threats below)? yes

b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? yes

c. If the answer to a. and b. is "yes", provide an explanation of why the action is precluded. We find that the immediate issuance of a proposed rule and timely promulgation of a final rule for this species has been, for the preceding 12 months, and continues to be, precluded by higher priority listing actions (including candidate species with lower LPNs). During the past 12 months, almost our entire national listing budget has been consumed by work on various listing actions to comply with court orders and court-approved settlement agreements, meeting statutory deadlines for petition findings or listing determinations, emergency listing evaluations and determinations, and essential litigation-related, administrative, and program management tasks. We will continue to monitor the status of this species as new information becomes available. This review will determine if a change in status is warranted, including the need to make prompt use of emergency listing procedures. For information on listing actions taken over the past 12 months, see the discussion of "Progress on Revising the Lists," in the current CNOR which can be viewed on our Internet website (<http://endangered.fws.gov/>).

☐ Listing priority change

Former LP: ☐

New LP: ____

Date when the species first became a Candidate (as currently defined): October 25, 1999

____ Candidate removal: Former LP: ____

____ A - Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.

____ U - Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species.

____ F - Range is no longer a U.S. territory.

____ I - Insufficient information exists on biological vulnerability and threats to support listing.

____ M - Taxon mistakenly included in past notice of review.

____ N - Taxon may not meet the Act's definition of "species."

____ X - Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Flowering plants, Asteraceae (Compositae), Aster Family

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Florida, U.S.A.

CURRENT STATES/ COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE: Florida, Monroe County, U.S.A.

LAND OWNERSHIP: *Chromolaena frustrata* occurs on public conservation lands at Everglades National Park near the Flamingo Visitor Center; in Lignumvitae Key Botanical State Park on Lignumvitae Key and Upper Matecumbe Key; Long Key State Park; and Key West National Wildlife Refuge on Boca Grande Key. The only large population, consisting of thousands of plants (which is expected to decline in size as the tree canopy recovers from hurricane disturbance) is on a privately-owned island.

LEAD REGION CONTACT: Richard Gooch, 404-679-7124

LEAD FIELD OFFICE CONTACT: South Florida Ecological Services Office, David Martin, 772-562-3909 ext 230

BIOLOGICAL INFORMATION:

Species Description: Erect fragrant herb 2-10 decimeters (8-39 inches) tall with 1 to many stems, which are hirtellous-puberulent or short spreading hirsute. Leaves are opposite, on slender petioles (leaf stalks) 4-10 millimeter (0.16 to 0.39 inch) long. The leaves are 3-nerved, 1.5-4 × 0.7-3 centimeters (0.6-1.6 × 0.3-1.2 inches). Flower heads are in small clusters, forming a diffuse inflorescence. The involucre of each head is 5.5-7.5 mm (0.2-0.3 inch) high. The involucre bracts are arranged like shingles (imbricate) in several series. Each head has 20-25 or

more small flowers, with blue or violet petals (Bradley and Gann 1999).

Taxonomy: Alvan Wentworth Chapman (1886) was the first to report this species in Florida, calling it *Eupatorium heteroclinium*, from the “Keys of South Florida.” *E. heteroclinium* had been named by Grisebach in 1864, as a species from Jamaica. John Kunkel Small also used this specific epithet, but he moved the species to the genus *Osmia*. In 1911, Benjamin Lincoln Robinson recognized the plant from the Keys as an endemic, naming it *Eupatorium frustratum*. Small’s floras (1913, 1933) called it *Osmia frustrata*, as did Ledin (1951). In 1970, R. M. King and H. E. Robinson placed this species in the genus *Chromolaena*. Floras by Long and Lakela (1971) and Cronquist (1980) reverted back to *Eupatorium* (which was traditionally treated as a large genus). Wunderlin (1998) and Wunderlin and Hansen (2003) use *Chromolaena frustrata* (Bradley and Gann 1999). In summary, this plant has been consistently recognized as a Florida Keys endemic since 1911.

Habitat: “This herb has been observed most commonly in open sun to partial shade at the edges of rockland hammock and in coastal rock barren. It was historically known from coastal berm along the northern edges of Florida Bay. It is often found under other plant species, buffering it from full exposure to the sun. It has not been observed in disturbed areas. Coastal rock barrens are composed of exposed Key Largo Limestone with a diverse assemblage of herbaceous plant taxa, many of which are halophytes [salt-tolerant].” (Bradley and Gann 1999). The ecology of coastal barrens is poorly understood. Presumably storm events affect these areas, and the presence of Brazilian pepper (*Schinus terebinthifolia*) suggests that barrens may be overrun by this aggressive exotic shrub.

Historical Range/Distribution:

Mainland (Everglades National Park) — In 1916, John Kunkel Small observed Cape Sable thoroughwort in Miami-Dade County in a hammock near the west end of Madeira Bay, along the edge of Florida Bay in what later became Everglades National Park. In 1921, Small and others collected specimens farther west, in hammocks between West Lake and Flamingo (collection number 9995, New York Botanical Garden herbarium). Bruce Ledin made collections of the species in 1947, one labeled “Cape Sable” and another labeled “Stream Bank, above Cape Sable.” Bradley and Gann (2004) note that the location of Ledin’s collection is uncertain because botanical collectors have used the term “Cape Sable” to refer to the greater Cape Sable/Flamingo region, not just the Cape itself. George N. Avery (1983) observed plants in low hammocks at two locations: along the west side of the Buttonwood Canal north of Bear Lake Road, and south of West Lake (Bradley and Gann 2004).

Florida Keys — “*C. frustrata* was historically known from nearly the entire range of the Florida Keys, from Key Largo near the upper end, to Boca Grande Key, west of Key West. It has never been found on the islands north of Key Largo in Biscayne National Park, despite extensive survey work It has also never been found west of Boca Grande in the Marquesas or Dry Tortugas, areas that have also been well explored by botanists.” (Bradley and Gann 2004).

Big Pine Key — Collected between 1838 and 1853. Another collection, without locality

data, was made in 1955. Recent surveys have not found this plant.

Fiesta Key — Probably collected in 1875 by Alvan W. Chapman. This island is occupied by a campground and is devoid of natural vegetation (Bradley and Gann 2004).

Key Largo — Northernmost island of occurrence. The species was collected in 1880 (Robinson 1911) and 1930. This large island has undergone extensive disturbance and development, so historic locations are likely to have been destroyed (Bradley and Gann 2004).

Key West — Collected between 1838 and 1853 (Robinson 1911). Today, only a small fragment of hammock exists at Little Hamaca Park (Bradley and Gann 2004).

Knights Key — Observed by George N. Avery in 1962. A collection was made in 1979. Because residential development occupies the island's uplands, no suitable habitat remains on the island (Bradley and Gann 2004).

Lignumvitae Key — Collected in the late nineteenth century, and still present. Now part of Lignumvitae Key Botanical State Park (Bradley and Gann 2004).

Long Key — First collected in 1875. Ann Buckley and Ted Hendrickson (in 1986) and Keith Bradley (in 1995) collected it in a coastal rock barren on the Florida Bay side of Long Key State Park, and it has been observed there since (Gann et al. 2002, Bradley and Gann 2004).

Lower Matecumbe Key — First collected in 1930 and recently reported by Janice Duquesnel (Florida Park Service, in litt. 2005).

Upper Matecumbe Key — *C. frustrata* was collected in 1892. Subsequent collections were made in 1919, 1962, 1968, and by Keith Bradley in 1998 (Bradley and Gann 1999).

Numerous unconfirmed reports exist: Roger Hammer (1995) from Greynolds Park, north of Buena Vista in Miami-Dade County; Moldenke (1940) from Buena Vista in Miami-Dade County (collection number 5459) and from "Turner's River Hammock" in Collier County (collection number 5770); and Small (1933) from hammocks of the Ten Thousand Islands.

Current Range/Distribution:

Everglades National Park — Bradley and Gann (2004) searched the Flamingo region but did not visit areas south of West Lake or to Madeira Bay. They observed fewer than 150 plants in the Park. "The colonies that were observed in Everglades National Park occurred along the ecotone between coastal berm and salt marshes dominated by *Conocarpus erectus* and halophytes (e.g. *Sesuvium portulacastrum*, *Batis maritima*, *Salicornia perennis*). At all of the locations where *C. frustrata* was observed, the plants were found . . . along the ecotone, in areas of scattered sunlight dominated by *Dicliptera sexangularis* and *Alternanthera flavescens* in the herb layer

and by various woody species including *C. erectus*, *Randia aculeate*, *Eugenia foetida*, *Sideroxylon celastrinum*, and *Capparis flexuosa*. *C. frustrata* was found in nearly all of the localities surveyed where this assemblage was found.” (Bradley and Gann 2004). “The edges of coastal berms in Everglades National Park have sustained human impacts such as road construction or clearing and exotic pest plant invasions that have probably caused a decline in the number of *C. frustrata* there” (Bradley and Gann 2004).

Florida Keys — Bradley and Gann (2004) found plants on five islands: Upper Matecumbe Key, Lignumvitae Key, Big Munson Island, Boca Grande, and Long Key. *Chromolaena frustrata* is no longer known from six other islands where it had been collected.

Big Munson Island — This island, owned by a private organization, is the location of the only large population of *Chromolaena frustrata*. Thousands of plants occupy a small rockland hammock near the west end of the island. Because the population was so dense, it was impossible to accurately determine its size.

Boca Grande Key — This island is part of the Key West National Wildlife Refuge. Bradley and Gann (2004) found approximately 25 plants along the edges of a small hammock in the center of the island.

Lignumvitae Key — Bradley and Gann (2004) found approximately 81 plants in two discrete groups along the south end of the island, which is a State Park.

Long Key — Bradley and Gann (2004) surveyed a coastal rock barren in May 2003. They found at least 200 plants, but this is probably an underestimate as the habitat is very difficult to search thoroughly. This area is mostly privately owned, including all of the rockland hammock, but a portion of the coastal rock barren has been added to Long Key State Park, protecting some plants.

Lower Matecumbe Key — Plants are present on the Klopp Tract of Lignumvitae Key Botanical State Park.

Upper Matecumbe Key — In 2003, 18 plants were found along a disturbed hammock edge in the Choate Tract of Lignumvitae Key Botanical State Park (Bradley and Gann 2004).

Population Estimates/Status: As of 2003 (Bradley and Gann 2004), the only large population was on Big Munson Island. Other populations: Boca Grande Key, 25 plants; Lignumvitae Key, 81 plants; Long Key, 362 plants; Upper Matecumbe Key, 18 plants; Everglades National Park, 150 plants. Bradley and Gann (2004) state that “fewer than 5,000 plants are estimated to exist.” The newly discovered population on Lower Matecumbe Key is not large. The Florida State Parks plan to conduct monitoring for rare plants on their properties in 2006.

THREATS:

- A. The present or threatened destruction, modification, or curtailment of its habitat or range. Habitat loss threatens *C. frustrata*. While more careful surveys might turn up a few more sites in the Keys, it is clear that *C. frustrata* has lost much habitat there, especially on heavily developed islands like Knights Key. Currently, it is known in the Keys from three non-conservation sites and two State Parks. Although public land acquisition and measures to limit growth in Monroe County have saved important habitat, the county is expected to experience moderate population growth. Monroe County's past and projected population is: 1990—78,024; 2000—79,589; 2010—82,414; 2020—84,253 (Florida Legislature 2005). Average annual population growth for Monroe County 2000-2004 was 0.62 percent per year and the trend is 1 percent per year or less (Florida Trend 2004). While recent information is lacking from the mainland (Ten Thousand Islands, Turner River, and Cape Sable), the prospects of *C. frustrata* occurring there may not be good due to a history of farming in the Cape Sable area and the spread of exotic pest plants. Its status in the Turner River area is unknown. Most *C. frustrata* habitat has been negatively altered or destroyed by human activity.
- B. Overutilization for commercial, recreational, scientific, or educational purposes. None known.
- C. Disease or predation. While Bradley and Gann (2004) report heavy predation, presumably by insects, on the large population at Big Munson Island, this is probably a natural situation and does not appear to constitute a threat to the species.
- D. The inadequacy of existing regulatory mechanisms. The Florida Department of Agriculture and Consumer Services (FDACS) has designated *Chromolaena frustrata* (= *Eupatorium frustratum*) as endangered under Chapter 5B-40, Florida Administrative Code. This listing regulates take without permission of the landowner. It provides little or no habitat protection beyond the State's Development of Regional Impact process, which serves to disclose impacts from projects, but provides no regulatory protection for plants listed by FDACS on private lands. Monroe County (the Florida Keys) does not have county ordinances preventing the destruction of imperiled plants.
- E. Other natural or manmade factors affecting its continued existence. "Brazilian pepper (*Schinus terebinthifolius*) occurs in all habitats where this species occurs and is currently a big problem in coastal rock barrens and rockland hammock ecotones. Latherleaf (*Colubrina asiatica*) is invading large areas of hammocks within Everglades National Park along the edge of Florida Bay. This species can radically change the structure of these hammocks and may be eliminating occurrences of this species." (Bradley and Gann 1999). Without proper control and eradication of these exotic plants, *Chromolaena frustrata* will become extirpated. Janice Duquesnel of the Florida Park Service commented in April 2005 that *Chromolaena frustrata* at Long Key State Park is on a cactus barren along with several other rare species.

Brazilian pepper was removed from the area inhabited by *Chromolaena frustrata* using herbicides and mechanical treatment. Lignumvitae Key Botanical State Park, including the Klopp tract on Lower Matecumbe Key, receives exotic pest plant removal treatments by Florida Park Service staff at least quarterly. The usual procedure is to use herbicides. Contractors may do mechanical clearing of exotics, but not in sensitive areas with rare plants such as *Chromolaena frustrata*. “Some mechanical disturbances [in Everglades National Park] would have also had an impact on *C. frustrata*, such as the construction of the Rowdy Bend Trail along the edge of a coastal berm. This construction impacted the population not just by clearing habitat but by creating disturbances that later led to exotic pest plant invasions.

The impacts of hydrological changes caused by rising sea level, changes in fresh water deliveries, and the construction of the Buttonwood Canal are unknown.” (Bradley and Gann 2004). Over the long run, sea level rise is a threat to this species. All known populations are in low lying areas near the coast (Bradley and Gann 1999), where sea level rise in the twentieth century has been shown to change the native vegetation (Ross and Ruiz 1996). Given the species’ narrow range and the small number of individuals that exist, these natural events could extirpate existing populations.

CONSERVATION MEASURES PLANNED OR IMPLEMENTED

There are no formal conservation agreements, but Service personnel are in regular contact with State Park and other conservation agency personnel in the Keys. Land purchased for State Parks on Upper Matecumbe Key and Long Key includes populations of this plant in natural habitat. Further acquisition is planned. A status survey was conducted in 2003 and the State Parks monitor rare plants at least every five years, new data are expected to be available for 2006.

SUMMARY OF THREATS (including reasons for addition or removal from candidacy, if appropriate)

The primary threats to *Chromolaena frustrata* is habitat loss in the Florida Keys, which has restricted it to relatively small areas of natural vegetation, combined with degradation of coastal habitats by exotic pest plants, primarily Brazilian pepper (*Schinus terebinthifolius*) and latherleaf (*Colubrina asiatica*). The lack of State or local protection of endangered plants represents a lesser threat.

For species that are being removed from candidate status:

___ Is the removal based in whole or in part on one or more individual conservation efforts that you determined met the standards in the Policy for Evaluation of Conservation Efforts When Making Listing Decisions (PECE)?

RECOMMENDED CONSERVATION MEASURES

LISTING PRIORITY

THREAT			
Magnitude	Immediacy	Taxonomy	Priority
High	Imminent	Monotypic genus	1
		Species	2*
	Non-imminent	Subspecies/population	3
		Monotypic genus	4
		Species	5
Moderate to Low	Imminent	Subspecies/population	6
		Monotypic genus	7
		Species	8
	Non-imminent	Subspecies/population	9
		Monotypic genus	10
		Species	11
		Subspecies/population	12

Rationale for listing priority number:

Magnitude: The Florida Keys are an inherently unstable environment, with the greatest frequency of hurricanes in the United States. Due to extensive development, remaining areas of natural vegetation are limited. Land acquisition by the State has benefited this species, as has private land management. However, only one large population of this species is known and its history suggests that it will decline as the forest canopy recovers. With so few populations in existence, it is not likely that the species will persist. These factors combined with the threat from invasive exotic pest plants constitutes a high magnitude threat.

The situation on the mainland in Everglades National Park is harder to evaluate because substantial areas of possible habitat have not been surveyed. The Everglades coastline, like the Keys, has severe problems with exotic pest plants, including latherleaf (*Colubrina asiatica*) and Brazilian pepper. Neither species has effective biological control. Even in a best-case scenario, with undiscovered populations of *C. frustrata* composed of thousands of individuals, the pest plant threat would be of high magnitude.

Imminence: While exotic pest plants are present at each site known to have *C. frustrata*, we anticipate that park managers will address these threats, depending on the availability of funds. The situation on the privately-owned site with the largest known population is encouraging. Local extirpations of this species, due to exotics or other reasons, can possibly be reversed. Bradley and Gann (2004) suggest several sites where reintroductions could be attempted. We consider the threats to this narrowly-endemic plant with no really large populations (in short-lived herbs, “viable” populations may consist of tens of thousands of individuals) to be imminent because the pest plants are currently present.

Rationale for Change in Listing Priority Number (insert if appropriate): N/A

Yes Have you promptly reviewed all of the information received regarding the species for the purpose of determining whether emergency listing is needed?

Is Emergency Listing Warranted? No. There is no threat from collection in parks, and *Chromolaena frustrata* is conserved at Everglades National Park, Lignumvitae Key State Botanical Park, and Long Key State Park.

DESCRIPTION OF MONITORING: The Service is in contact with managers of lands inhabited by this species. The Service sponsored a status survey, completed in 2003. The Florida State Parks monitored imperiled plants on their properties in 2001 (five monitoring plots were established at Long Key State Park, in the coastal rock barren) and will conduct an update in 2006. Bradley and Gann (2004) suggest annual monitoring at Long Key State Park to detect changes in the population and to observe changes in the vegetation surrounding *Chromolaena frustrata*.

COORDINATION WITH STATES

Indicate which State(s) (within the range of the species) provided information or comments on the species or latest species assessment: The State of Florida provided information on the species.

Indicate which State(s) did not provide any information or comments: N/A

LITERATURE CITED:

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APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.

Approve: /s/ Jeffrey M. Fleming 11/16/2005
Acting Regional Director, Fish and Wildlife Service Date



Concur: _____ August 23, 2006
Acting Director, Fish and Wildlife Service Date

Do Not Concur: _____
Director, Fish and Wildlife Service Date

Date of annual review: October 2005

Conducted by: South Florida (Vero Beach) Field Office